What is claimed is:

1. A semiconductor device comprising:

a substrate comprising a layer of silicon germanium formed over a silicon germanium carbide thermal dissipation layer;

shallow trench isolations formed in the silicon germanium layer and defining an active region of the substrate; and

a MOSFET formed in the active region and incorporating strained silicon grown on the silicon germanium layer in at least a channel region thereof.

2. The device claimed in claim 1, wherein the silicon germanium carbide thermal dissipation layer is formed over a silicon layer.

3. The device claimed in claim 1, wherein the silicon germanium carbide thermal dissipation layer is formed over a dielectric layer.

4. The device claimed in claim 1, wherein the shallow trench isolations comprise an oxide trench liner and a silicon carbide bulk fill material.

5. The device claimed in claim 4, wherein the shallow trench isolations extend through the silicon germanium layer to contact the silicon germanium carbide thermal dissipation layer.

6. A method for the formation of a semiconductor device, comprising:

providing a substrate comprising a silicon layer, a silicon germanium carbide thermal dissipation layer formed on the silicon layer, and a silicon germanium layer formed on the silicon germanium carbide thermal dissipation layer;

growing a layer of strained silicon on the silicon germanium layer; and

forming a MOSFET on the substrate that incorporates the strained silicon in at least a channel region thereof.

7. The method claimed in claim 6, wherein growing the layer of strained silicon is preceded by forming shallow trench isolations in the silicon germanium layer to define an active region of the substrate in which the MOSFET is to be formed.

8. The method claimed in claim 7, wherein the shallow trench isolations comprise an oxide trench liner and a silicon carbide bulk fill material.

9. The method claimed in claim 8, wherein the shallow trench isolations extend through the silicon germanium layer to contact the silicon germanium carbide thermal dissipation layer.

10. The method claimed in claim 6, wherein providing the substrate comprises:

providing a silicon wafer;

growing the silicon germanium carbide thermal dissipation layer on the silicon wafer; and

growing the silicon germanium layer on the silicon germanium carbide thermal dissipation layer.

11. A method for the formation of a semiconductor device, comprising:

providing a substrate comprising a dielectric layer, a silicon germanium carbide thermal dissipation layer formed on the dielectric layer, and a silicon germanium layer formed on the silicon germanium carbide thermal dissipation layer;

growing a layer of strained silicon on the silicon germanium layer; and

forming a MOSFET on the substrate that incorporates the strained silicon in at least a channel region thereof.

12. The method claimed in claim 11, wherein growing the layer of strained silicon is preceded by forming shallow trench isolations in the silicon

germanium layer to define an active region of the substrate in which the MOSFET is to be formed.

13. The method claimed in claim 12, wherein the shallow trench isolations comprise an oxide trench liner and a silicon carbide bulk fill material.

14. The method claimed in claim 13, wherein the shallow trench isolations extend through the silicon germanium layer to contact the silicon germanium carbide thermal dissipation layer.

15. The method claimed in claim 11, wherein providing the substrate comprises:

providing a first silicon wafer;

forming the silicon germanium layer on the first silicon wafer;

forming the silicon germanium carbide thermal dissipation layer on the silicon germanium layer;

implanting hydrogen into the silicon germanium layer to form a hydrogen rich region in the silicon germanium layer;

forming a dielectric layer on a second silicon wafer;

bonding the silicon germanium carbide thermal dissipation layer of the first silicon wafer to the dielectric layer of the second silicon wafer and concurrently fracturing the silicon germanium layer in the hydrogen rich region; and

removing first silicon wafer.

16. The method claimed in claim 15, wherein forming the silicon germanium carbide thermal dissipation layer comprises implanting carbon into the silicon germanium layer.

17. The method claimed in claim 15, wherein forming the silicon germanium carbide thermal dissipation layer comprises diffusing carbon into the silicon germanium layer.

18. The method claimed in claim 15, wherein forming the silicon germanium carbide thermal dissipation layer comprises growing the silicon germanium carbide thermal dissipation layer on the silicon germanium layer by chemical vapor deposition using source gases that provide silicon, germanium and carbon precursors.

19. The method claimed in claim 18, wherein the source gases comprise organosilicates.

20. The method claimed in claim 11, wherein providing the substrate comprises:

providing a silicon wafer;

growing the silicon germanium carbide thermal dissipation layer on the silicon wafer;

growing the silicon germanium layer on the silicon germanium carbide thermal dissipation layer;

implanting oxygen into the silicon germanium carbide thermal dissipation layer; and

annealing to form an oxide region in the silicon germanium carbide thermal dissipation layer.